

Attorney's Docket No. 33377/196876

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES

*Fee only*

In re the application of: FARAMARZ FARAH

Serial No. 09/803,342

Group No. 2874

Filed: 9 March 2001

Examiner: Ullah, Akm Enayet

For: INTEGRATED OPTICAL CIRCUITS

**Board of Patent Appeals and Interferences**  
**United States Patent and Trademark Office**  
**P.O. Box 1450**  
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APPEAL BRIEF

Sir:

This brief is in furtherance of the Notice of Appeal filed on 24 February, 2005, in this case on the final rejection of claims 97, 99-117 and 133 in United States Application Serial No. 09/803.342 filed on 9 March 2001.

The fees required are dealt with in the accompanying CREDIT CARD PAYMENT FORM and TRANSMITTAL FORM.

One copy of this appeal brief is transmitted (37 CFR 41.37).

This brief contains these items under the following headings and in the order set forth below (37 CFR 41.37(c)):

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- I. REAL PARTY IN INTEREST
- II. RELATED APPEALS AND INTERFERENCES
- III. STATUS OF CLAIMS

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- IV. STATUS OF ADMENDMENTS
- V. SUMMARY OF CLAIMED SUBJECT MATTER
- VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL
- VII. ARGUMENT
- VIII. CLAIMS APPENDIX
- IX. EVIDENCE APPENDIX
- X. RELATED PROCEEDINGS APPENDIX

The final page of this appeal brief bears the attorney's signature.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Waveguide Solutions, Inc.

II. RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or having a bearing on the Board's decision in this appeal: There are no such appeals or interferences.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application:

Claims in the application are 133.

B. Status of All the Claims

1. Claims canceled: 1-96 and 98.

2. Claims withdrawn from consideration but not canceled: 118-132.

3. Claims pending: 97, 99-117 and 133.

4. Claims allowed: None.

5. Claims rejected: 97, 99-117 and 133.

C. Claims on Appeal

The claims on appeal are 97, 99-117 and 133.

IV. STATUS OF AMENDMENTS

The Amendment after Final Rejection filed on 24 February, 2005 was entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention relates to an optoelectronic device comprising: a substrate having a first surface; and at least one optical interconnect formed on the first surface of said substrate comprising a sol-gel based material including an active region defined in the sol-gel based material, wherein the active region comprises rare earth ions. Support for the summary of the claimed invention is found at: page 6, lines 15-17 and 24-31; page 7, lines 3-9; and Figure 1, which is described at page 12, lines 11-21.

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claims 97, 99-117 and 133 were finally rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent 5,480,687 (Heming et al) in view of U.S. Patent 5,887,089 (Deacon et al), U.S. Patent 5,363,398 (Glass et al), or U.S. Patent 5,249,195 (Feldman et al).

VII. ARGUMENT

Rejection Under 35 U.S.C. 103(a)

The examiner's position was that Heming et al **"disclose the gist of the invention."** He further stated: **"Note that in any optical interconnect device having sol-gel based material used for active region which is an inherent of this reference."** The examiner went on to say **"One of ordinary skill in the art would have found it an obvious design choice to incorporate an optoelectronic device having flexible substrate and optical interconnect comprising sol-gel material formed on the flexible material which would include point to point waveguides, port to multipoint, multipoint to**

**multipoint waveguides or in combination, as it is claimed in Heming et al in view of the aforementioned references.”**

In the prior art non-sol-gel optical interconnects, the base material is normally glass or another silica-based material. In providing an active optical interconnect in these prior art materials, the active region is normally provided by doping the base material with a rare earth ion such as erbium or ytterbium, which chemically bonds with the base material.

The present claimed invention relates to an optoelectronic device comprising optical interconnects formed from a sol-gel material. In the past, the use of a sol-gel material to provide a flexible optical interconnect device was limited to a passive material. In the present invention an active region is defined in the sol-gel based material. In contrast to the prior art silica-based base materials, the dopant ions do not chemically bond with the base material in the present invention. The active region is accomplished because, rather than being clustered or chemically bonded, the rare earth ions are dispersed within the sol-gel base material. Clustering of the ions would not allow the easy transfer of energy within the optical interconnect. As a result, the rare earth ions in the claimed invention are enclosed or “caged”, such as in a tris (8-hydroxyquinoline) molecule, referred to as the “Q” form of the rare earth element. In such a caged form, the rare earth ions appear to be physically bigger in size and are easier to activate to facilitate the transfer of energy when subjected to photon bombardment.

Heming et al disclose a process for producing a high-refractive index optical waveguide with an essentially planar substrate exhibiting high breaking strength. An inorganic waveguide material is applied to the essentially planar substrate, which is made from a synthetic resin or another material having a high organic proportion. Although Heming et al suggest producing an optical base material produced by a sol-gel technique, appellant can find no teaching or suggestion of providing an active region defined within a sol-gel material.

Deacon et al disclose an optical energy transfer device and an energy guiding device that use an electric field to control energy propagation using a

class of poled structures in solid material. The invention may be a switchable grating which consists of a poled material with an alternating domain structure of a specific period.

Glass et al disclose an optically active medium, wherein the absorption properties can be changed drastically by a Fabry-Perot microcavity. Erbium-implanted SiO<sub>2</sub> may be used as the optically active medium. The structure can be used for optically pumped semiconductor devices.

Feldman et al disclose an optical device with a Fabry-Perot microcavity formed by two reflective mirrors and an active layer that is doped with a rare earth element from the Lanthanide series. The fundamental mode of the cavity is in resonance with the emission wavelength of the selected rare earth element. The three secondary prior art references teach vertical cavity type devices, which may be erbium doped and do have an active area.

However, there is no disclosure or suggestion in Deacon et, Glass et al, or Feldman et al of a planar waveguide or an optical interconnect. In addition, there is no suggestion of the sol-gel base material having an active area, as required by appellant's claimed invention.

It is the examiner's position that "Heming et al disclose the gist of the invention" and that the claims are unpatentable over the cited references. Appellant has been unable to find any reference or suggestion in any of the cited prior art to "a sol-gel based material including an active region defined in the sol-gel based material" or to the use of a dopant to create an active region within the sol-gel base material.

Appellant was unable to find any specific disclosures in the cited prior art to support the examiner's conclusions. A general reference to the cited prior art, without citing the relevant columns and line numbers for the disclosures relied upon by the examiner, makes it extremely difficult to adequately assess the examiner's rejections and the reasoning upon which they are based. Appellant has attempted to find the most relevant portions of the cited prior art. A specific citation of the relevant portions of the cited prior art would have allowed appellant

the opportunity to discuss the applicability or non-applicability of these specific citations to the patentability of the claimed invention.

In view of the above arguments and the previous amendments to the claims, it is submitted that the claims should be allowable over the cited prior art. A reversal of the Final Rejection is, therefore, respectfully requested.

VIII. CLAIMS APPENDIX

A copy of claims 97, 99-117 and 133, involved in the appeal is attached.

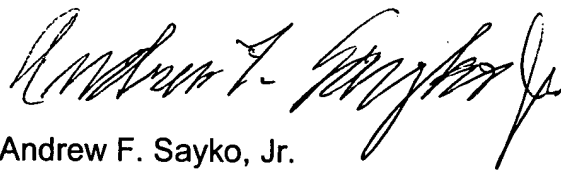
IX. EVIDENCE APPENDIX

No evidence is appended.

X. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Andrew F. Sayko, Jr.", written in a cursive style.

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## VIII. CLAIMS APPENDIX

97. An optoelectronic device comprising:  
a substrate having a first surface; and at least one optical interconnect formed on the first surface of said substrate comprising a sol-gel based material including an active region defined in the sol-gel based material, wherein the active region comprises rare earth ions.
99. The optoelectronic device of claim 97, wherein the rare earth ions have transition lines in the about 0.2 micron to about 3.0 micron spectrum when illuminated by at least one optical source.
100. The optoelectronic device of claim 97, wherein the rare earth ions have transition lines in the about 1.5 micron range when illuminated by at least one optical source.
101. The optoelectronic device of claim 97, wherein the rare earth ions comprise a rare earth ion chosen from the group consisting of erbium, ytterbium and neodymium ions.
102. The optoelectronic device of claim 97, wherein the rare earth ions comprise erbium and ytterbium ions.
103. The optoelectronic device of claim 97, wherein the sol-gel based material further comprises at least one electro-optic organic compound.
104. The optoelectronic device of claim 97, wherein the wherein the active region is capable of being side-pumped.

105. The optoelectronic device of claim 97, further comprising at least one optical source for optically pumping the active region.

106. The optoelectronic device of claim 105, wherein the at least one optical source is chosen from the group consisting of at least one vertical cavity surface emitting laser (VCSEL), at least one further laser, at least one waveguide laser and at least one semiconductor laser.

107. The optoelectronic device of claim 105, wherein the at least one optical source is used to side-pump the active region of the optical interconnect.

108. The optoelectronic device of claim 105, further comprising an optical detector that is in optical communication with the optical interconnect for detecting an optical signal within the optical interconnect.

109. The optoelectronic device of claim 108, wherein the optical connector comprises a sol-gel material.

110. The optoelectronic device of claim 97, wherein the at least one optical interconnect further comprises grating structures formed on the at least one optical interconnect.

111. The optoelectronic device of claim 110, wherein the grating structures have a fixed periodicity.

112. The optoelectronic device of claim 110, wherein the grating structures have a chirped periodicity.

113. The optoelectronic device of claim 97, wherein the at least one optical interconnect further comprises prism structures formed on the at least one optical interconnect.



114. The optoelectronic device of claim 97, wherein the at least one optical interconnect further comprises a plurality of optical interconnects disposed in a predetermined pattern on the first surface of the substrate.

115. The optoelectronic device of claim 114, wherein the plurality of optoelectronic interconnects are point-to-point waveguides.

116. The optoelectronic device of claim 114, wherein the plurality of optoelectronic interconnects are point-to-point multipoint waveguides.

117. The optoelectronic device of claim 114, wherein the plurality of optoelectronic interconnects are point-to-point waveguides and multipoint waveguides.

133. The optoelectronic device of claim 97, wherein the active region comprises rare earth ions surrounded by a tris (8-hydroxyquinoline) molecule.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>TRANSMITTAL FORM</b>  (to be used for all correspondence after initial filing)	Application Number	09/803,342	
	Filing Date	9 March 2001	
	First Named Inventor	Faramarz Farahi	
	Art Unit	2874	
	Examiner Name	Ullah, Akm Enayet	
Total Number of Pages in This Submission	//	Attorney Docket Number	33377/196876

ENCLOSURES (Check all that apply)		
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Printed name	ANDREW F SAYKO JR	
Date	25 April 2005	Reg. No. 22,827

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